

What is claimed is:

- 1 1. A photolithographic reduction projection catadioptric objective with a beam path,  
2 comprising: a first optical group (G1) including an even number of at least four mirrors  
3 (M1-M6); and a second at least substantially dioptric optical group (G2) more  
4 imageward than said first optical group including a number of lenses (E4-E13), and  
5 wherein said first optical group (G1) provides compensative axial colour correction for  
6 said second optical group (G2).
- 1 2. The objective of Claim 1, wherein said image is formed with a numerical aperture of at  
2 least substantially 0.65.
- 1 3. The objective of Claim 1, said first optical group producing an intermediate virtual  
2 image (VF).
- 1 4. The objective of Claim 1, wherein said at least four mirrors (M1-M6) of said first  
2 optical group (G1) include a convex mirror (M6) arranged most imageward in the beam  
3 path of the objective, and wherein said second optical group (G2) receives a beam from  
4 said convex mirror (M6).
- 1 5. The objective of Claim 1, wherein optical surfaces of each mirror M1-M6 of said  
2 objective are at least sections of surfaces of revolution each having a common axis (A)  
3 of symmetry.
- 1 6. The objective of Claim 1, wherein said second optical group is configured for  
2 independent compensative lateral aberrative correction.

A photolithographic reduction projection catadioptric objective, comprising: a first optical group (G1) including an even number of at least four mirrors (M1-M6) for producing a virtual intermediate image (VI); and a second at least substantially dioptric optical group (G2) more imageward than said first optical group (G1), said second optical group (G2) including a number of lenses (E4-E13) for receiving the virtual image (VI) and providing image reduction, and wherein said first optical group (G1) provides compensative axial colour correction for said second optical group (G2).

The objective of Claim 7, wherein said second optical group (G2) is configured for independent compensative lateral colour correction.

The objective of claim 1, wherein said image is formed with a numerical aperture of at least substantially 0.70.

The objective of claim 1, wherein said image is formed with a numerical aperture of at least substantially 0.75.

A photolithographic reduction projection catadioptric objective, comprising: a first optical group (G1) including an even number of at least four mirrors (M1-M6) including a convex most imaged mirror (M6), and a second at least substantially dioptric optical group (G2) more imaged than said first optical group (G1) receiving a beam from the convex most imaged mirror (M6) of the first optical group (G1), said second optical group (G2) including a number of lenses (E4-E13) providing image reduction, and wherein said first optical group (G1) provides compensative axial colour correction for said second optical group (G2).





4 second catadioptric sub group comprising one or more negative lenses (E2, E3) and a  
5 concave mirror (M2), generating axial chromatic aberration, a third sub group  
6 including an odd number of catoptric components (M4, M5, M6), and a fourth positive  
7 lens group (G2).

1 26. The objective of Claim 11, wherein said second optical group (G2) comprises a  
2 plurality of lenses (E4-E13), wherein a diameter of a beam incident upon each of said  
3 plurality of lenses is at least half of a diameter of said each lens (E4-E13).

1 27. The objective of Claim 11, wherein said objective is doubly telecentric.

1 28. The objective of Claim 11, wherein optical paths of projected rays are redirected at  
2 each lens element (E4-E13) of said second optical group at an angle of less than  
3 substantially 20°.

1 29. The objective of Claim 11, wherein said image is formed with a numerical aperture of  
2 at least substantially 0.70.

1 30. The objective of Claims 11, wherein said image is formed with a numerical aperture of  
2 at least substantially 0.75.